Bull. nat. Hist. Mus. Lond. (Geol.) **53**(2): 135–138 Issued 27 November 1997

New information on Cretaceous crabs

C.W. WRIGHT
The Old Rectory, Seaborough, Beaminster, Dorset DT8 3QY

SYNOPSIS. Re-examination of the supposedly Jurassic, Tithonian crab fauna from Klement in Austria shows that it is Cretaceous, Cenomanian, thus removing the puzzling record of *Diaulax* from the Jurassic. A new species of *Paranecrocarcinus* is described from the Lower Cretaceous, Barremian of Zululand, South Africa. New material from the English Lower Cretaceous is described, including a new species of *Rathbunopon* from the Lower Aptian and important new information about *Withersella*.

THE KLEMENT 'TITHONIAN' CRAB FAUNA

In 1931 Glaessner listed a small fauna of Crustacea from a block of presumed Tithonian limestone in a conglomerate at Klement in Lower Austria. It is of importance because it included a species of *Diaulax*, a relatively advanced genus otherwise known only from the Cretaceous, Lower Albian to Cenomanian. Shortly before his death Glaessner entrusted me with his Klement specimens with a view to joint description, since he had doubts about their Jurassic date. These doubts were fully justified, since revised identifications indicate that the fauna is almost certainly of Cenomanian date.

The original (Glaessner, 1931) and the new identifications are:

Original:	*Revised:*
Prosopon verrucosum Reuss	*Rathbunopon obesum* (Van Straelen)
Pithonoton marginatum Meyer	*Pithonoton cenomanense* Wright & Collins
Cyphonotus oxythyreiformis (Gemmellaro)	*Palaeodromites incertus* (Bell)
Diaulax sp.	*Diaulax oweni* (Bell)

The '*Prosopon verrucosum*' (BMNH IC 6, Fig. 1) resembles very closely the fragmentary English Cenomanian specimen identified by Wright & Collins (1972: 23, pl. 1, fig. 8) as *Rathbunopon obesum* (Van Straelen), a species originally described from the Cenomanian of Navarre, Spain. A second, minute, specimen (BMNH IC 14, Fig. 2) probably belongs to the same species but is too juvenile for certain attribution.

The '*Pithonoton marginatum*' (BMNH IC 17, Fig. 3) conforms well with *P. cenomanense* Wright & Collins in the outline of the cephalothorax, the course of the cervical and branchiocardiac grooves, and the disposition of the granules. Differences between species of *Pithonoton* are generally fine, but identity with *P. cenomanense* seems highly probable.

The '*Cyphonotus oxythyreiformis*' (BMNH IC 8, Fig. 4), though incomplete, is beautifully preserved and is undoubtedly identical with *Palaeodromites incertus,* of which an English specimen of the same size is figured for comparison (Fig. 5). Species of *Palaeodromites* were shown by Wright & Collins to have a short range in the Cretaceous and this Klement specimen alone is sufficient to demonstrate the Cenomanian age of the fauna.

The '*Diaulax sp.*' (BMNH IC 7, Fig. 6) is certainly a *Diaulax* and differs in no way from the abundant English material of *D. oweni* from the Lower Albian to the Cenomanian. The immediate ancestor of *D. oweni* has not been identified but Wright & Collins (1972: 55) referred to the origin of *Diaulax* in 'broad flat species of *Pithonoton*'; they commented (p. 56) on the supposed Upper Jurassic occurrence from Klement as representing 'a very early development of a relatively advanced carapace form', an anomaly now removed by the revised dating of the Klement fauna.

A NEW SPECIES OF *PARANECROCARCINUS* FROM THE BARREMIAN OF ZULULAND

Genus *Paranecrocarcinus* Van Straelen, 1936

TYPE SPECIES. *Paranecrocarcinus hexagonalis* Van Straelen, 1936 (p. 36, pl. 4, figs. 6, 7) from the Hauterivian of Auxerre, France, by monotypy.

DISCUSSION. Wright & Collins (1972) differentiated *Paranecrocarcinus* from *Necrocarcinus* by the bifid rostrum of the former and the trifid rostrum of the latter. They then united Förster's (1968) *Protocarcinus*, as a synonym, and *Pseudonecrocarcinus* as a subgenus of *Paranecrocarcinus*, separating the two subgenera partly on the basis that *P. (Paranecrocarcinus)* did not have and *P. (Pseudonecrocarcinus)* did have post-rostral slits in the carapace. This distinction was false, since the type species *P. hexagonalis* does have post-rostral slits. The remaining diagnostic character of *Pseudonecrocarcinus*, the many small rounded tubercles on the surface of the carapace, as seen both in the Maastrichtian type species *P. (Pseudonecrocarcinus) quadriscissus* (Noetling) and in the Cenomanian *P. (P) biscissus* Wright & Collins, might be thought sufficient to justify the two subgenera. However, some doubt is cast on this idea by the juvenile specimen of *P. biscissus* discussed in the last section of this paper below. Provisionally I am inclined to abandon the distinction of two subgenera.

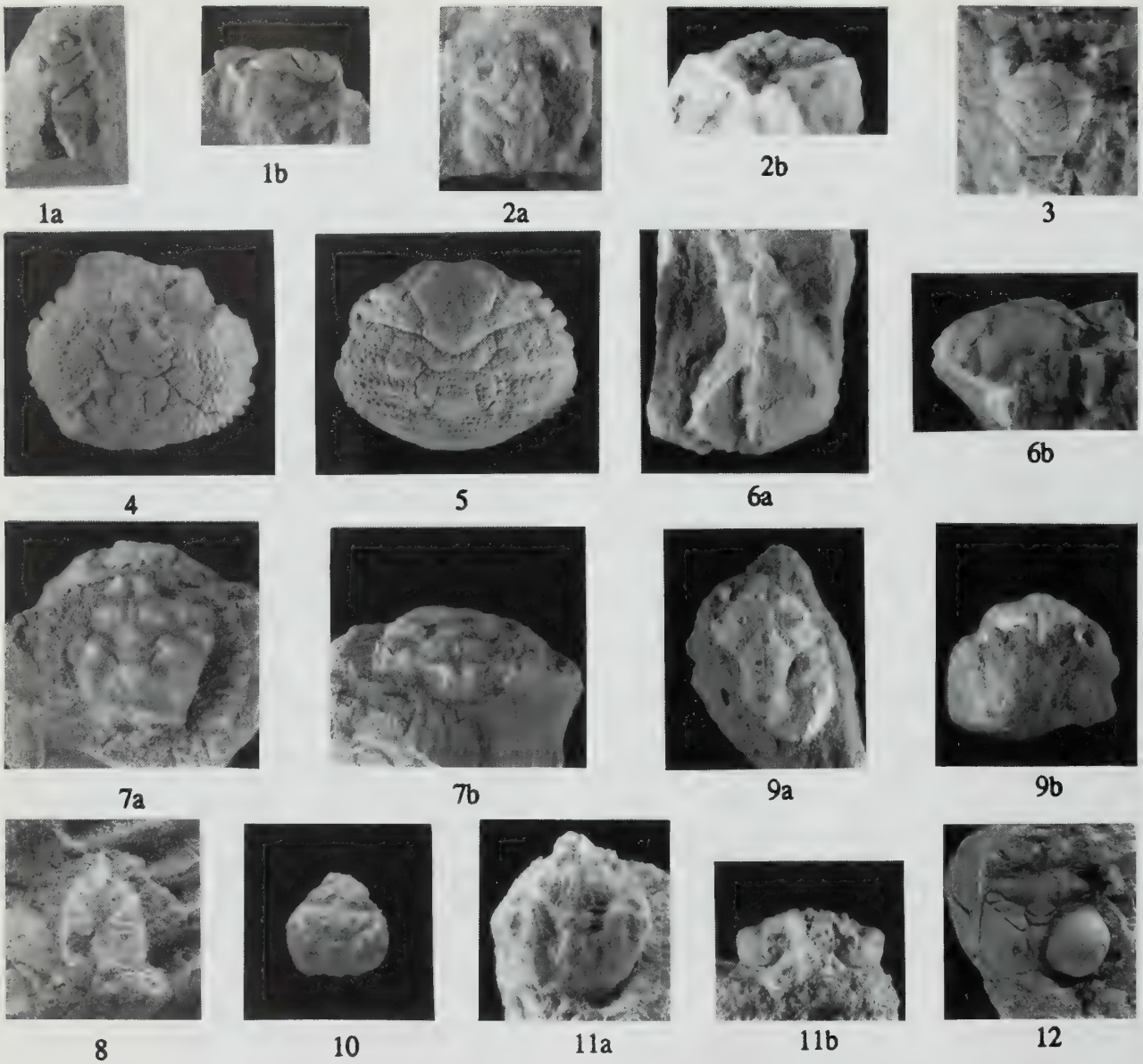
Paranecrocarcinus kennedyi sp. nov. Figs 7, 13

NAME. For Professor W J Kennedy who found the specimen.

HOLOTYPE. BMNH IC 16, from the Barremian Makatini Formation, Mlambongwenya Spruit, Zululand, South Africa.

DIAGNOSIS. A *Paranecrocarcinus* with a transverse row of nine tubercles across the gastric regions and a single one on each metabranchial lobe and with two prominent spines on the anterolateral border; apparently without post-rostral slits.

DESCRIPTION. The holotype consists of an internal mould with the rostrum and margins only partially preserved, together with the counterpart showing the central area of the cephalothorax in hard



Figs 1, 2 *Rathbunopon obesum* (Van Straelen). Limestone boulder in conglomerate, Klement, Lower Austria, Cenomanian. **1**, BMNH IC6; **1a**, upper, **1b**, right side, ×2; **2**, BMNH IC 14, **2a**, upper, **2b**, right side, ×4.

Fig. 3 *Pithonoton cenomanense* Wright & Collins. As for Figs. 1, 2. BMNH IC 17. ×2.

Figs 4, 5 *Palaeodromites incertus* (Bell). **4,** as for Figs. 1, 2, BMNH IC 8, ×2. **5**, Cenomanian Sands, Lower Cenomanian, *Mantelliceras dixoni* Zone, White Hart Pit, Wilmington, Devon, BMNH IC 9, ×2.

Fig. 6 *Diaulax oweni* (Bell). As for Figs. 1, 2. BMNH IC 7; **6a**, upper, **6b**, right side, ×2.

Fig. 7 *Paranecrocarcinus kennedyi* sp.nov. Holotype. Makatini Formation, Barremian, Mlambongwenya Spruit, Zululand, South Africa. BMNH IC 16; **7a**, upper, **7b**, front, ×2.

Fig. 8 *Galathea* sp. Lower Greensand, Crackers Bed, *Deshayesites forbesi* Zone, Atherfield, Isle of Wight. BMNH IC 13, ×4.

Fig. 9 *Rathbunopon ? atherfieldense* sp.nov. Holotype. As for Fig. 8. BMNH IC 11; **9a**, upper, **9b**, front, ×4.

Fig. 10 *Paranecrocarcinus biscissus* Wright & Collins. Cenomanian Limestone, Bed A or B, Whitecliff, Seaton, Devon. BMNH IC 10, ×2.

Fig. 11 *Paranecrocarcinus digitatus* Wright & Collins. As for Fig. 5. BMNH IC 5; **11a**, upper, **11b**, front, ×2.

Fig. 12 *Withersella crepitans* Wright & Collins. As for Fig. 8. BMNH IC 15, upper, ×2.

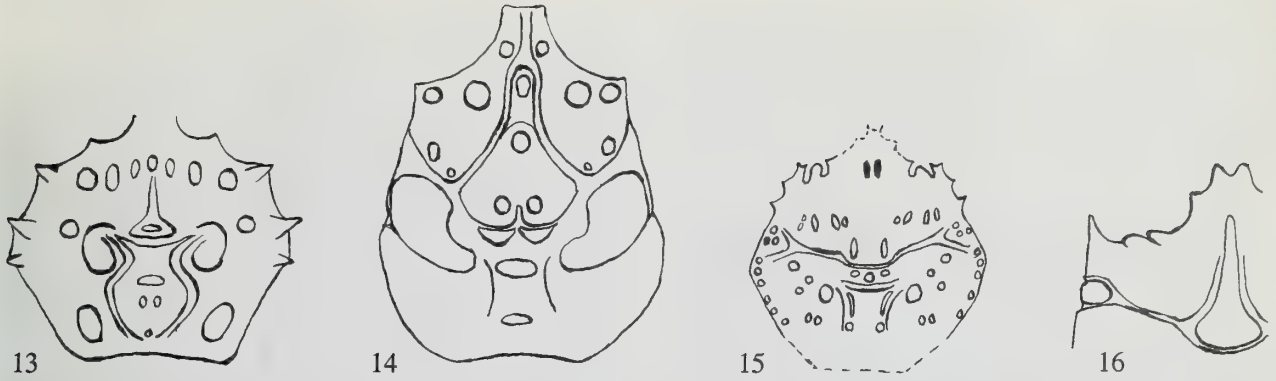


Fig. 13 *Paranecrocarcinus kennedyi* sp.nov. Makatini Formation, Barremian, Zululand, South Africa. Reconstruction, based on the holotype, Fig. 7. × ca. 3.

Fig. 14 *Rathbunopon ? atherfieldense* sp.nov. Lower Greensand, Crackers Bed, Lower Aptian, Atherfield, Isle of Wight. Reconstruction, omitting the granulation, based on the holotype, Fig. 9, and paratype. The orbito-frontal margins are diagrammatic, since details of fissures and teeth are not preserved. × ca. 8.

Fig. 15 *Paranecrocarcinus biscissus* Wright & Collins. Cenomanian Limestone, Whitecliff, Seaton, Devon. Diagrammatic reconstruction, based on specimen in Fig. 10. × ca. 4.

Fig. 16 *Withersella crepitans* Wright & Collins. Lower Greensand, Crackers Bed, Lower Aptian, Atherfield, Isle of Wight. Diagram of left frontal margin, based on specimen in Fig. 12. × ca. 5.

matrix and visible only from underneath. The cephalothorax is roughly pentagonal in outline with slightly convex anterolateral, straight posterolateral and slightly concave posterior margins. It is weakly arched in transverse and longitudinal sections, with apparently deeply undercut sides. The front is produced into a broad sulcate rostrum, incompletely preserved but showing upwardly directed rostral spines. The orbital margins are not well-preserved but the orbits appear to have been moderately wide with a fissured upper rim and an outer orbital spine; the orbito-frontal width was about half that of the carapace.

The anterolateral margin ends in a spine at the lateral angle, and there is one between this and the outer orbital spine. The long posterolateral margins are almost straight and converge towards the slightly concave posterior margin.

The cervical sulcus is bent strongly round the rear of the mesogastric lobe and then takes a sinuous oblique course to the margins. Distinct epibranchial sulci branch obliquely to the rear and define small triangular epibranchial lobes. The branchiocardiac sulci are weaker than the cervical and are more or less parallel to it in their outer part; they run back between the small triangular cardiac lobe and a small parallel ridge on either side.

DISCUSSION. The Hauterivian *P. hexagonalis* has two large tubercles on the mesogastric lobe but no others forward of the cervical sulcus and has a pair of post-rostral slits. The Cenomanian *P. mozambiquensis* Förster, 1970, has a single large tubercle on each protagastric lobe. *P. libanoticus* Förster, 1968, from the Cenomanian of Lebanon has a single small tubercle on the mesogastric lobe, two large ones on each protogastric and two smaller ones on each anterior branchial lobe; it also has two post-rostral slits. The Turonian *P.ovalis* Stenzel from Texas has an aligned row of large tubercles across the hepatic and protogastric lobes as in *P. kennedyi*, but the cephalothorax is much broader than long and has a less pentagonal outline, as does the Upper Albian *P. graysonensis* Rathbun, 1935, with weaker tuberculation. *P. digitatus* Wright & Collins, 1972, from the English Cenomanian has a pair of post-rostral slits (Collins *et al.*, 1995: 198), and is characterised by its elongated radiating ridges on the protogastric lobes. *P. foesteri* Wright & Collins, 1972, differs in having strongly granulated posterolateral margins and posterior edges of the branchiocardiac furrows. However, none of these species is known by more than a very few specimens and the extent of intraspecific variation is unknown.

SOME NEW ENGLISH CRETACEOUS CRABS

Galathea sp. nov.? Fig. 8

A poorly preserved *Galathea* has been found in Lower Aptian Crackers material from Atherfield, supplied by Prof. W.J. Kennedy. It is inadequate for proper description, but it is worth recording since, with a specimen from the Aptian of Spain (Via Boada, oral communication), it is probably the oldest known species of the genus.

Rathbunopon? atherfieldense sp. nov. Figs 9, 14

TYPES. The holotype is BMNH IC 11 and paratype IC 12, both from Lower Greensand, Crackers Bed, Lower Aptian, *D. callidiscus* Zone, Atherfield Point, Isle of Wight.

DIAGNOSIS. A presumed primitive *Rathbunopon*, longer than wide, with the paired bosses at the rear of the mesogastric lobe small and close together; the urogastric lobe feebly developed, divided by a shallow longitudinal groove.

DESCRIPTION. Small, 7 mm long, about 25% longer than wide, narrowed in front and with slightly convex margins; strongly arched in transverse section, less so in longitudinal; front turned down and deeply furrowed; orbitofrontal margins oblique at about 45°. The furrows delimiting the mesogastric lobe are shallow in front but deepen as they approach the cervical furrow, which is wide and deep laterally. The branchiocardiac furrows are shallower than the cervical. There is a strong circular epigastric boss on either side of the medial furrow, a feeble longitudinal oval one on the anterior process

of the mesogastric lobe, a large round one on the middle of the lobe and a transverse pair of small ones to the rear; there is a large round boss on the middle of each hepatic lobe and an outer small one, all forming a transverse line with the anterior mesogastric boss. All the raised areas of the cephalothorax have well-separated small granules between the bosses.

DISCUSSION. The holotype is incomplete, lacking nearly all of the frontal and lateral margins. The arrangement of the lobes, except for the urogastric which is weakly bilobed longitudinally rather than divided transversely into two bars, is close to that of *R. polyakron* Stenzel and *R. woodsi* Withers. The epigastric, mesogastric and hepatic bosses also are similar in disposition. It is highly probable that the present species is a primitive *Rathbunopon* but in the absence of evidence of the characteristic orbits attribution must remain uncertain. There is some resemblance to the fragmentary holotype of the Hauterivian *Homolopsis tuberculata* Van Straelen, 1936, which may also be a *Rathbunopon.*

Paranecrocarcinus biscissus? Wright & Collins, 1972 Figs 10, 15

An incompletely preserved internal mould from the Cenomanian of Whitcliff, Seaton, Devon (BMNH IC 10) has the same arrangement of outer orbital spines and fissures as *P. biscissus* Wright & Collins (1972: text-fig. 10b) and a multiplicity of small tubercles, including three on the urogastric lobe. However the number and arrangement of the other tubercles is not exactly as in the holotype of *P. biscissus*. The present specimen has an estimated breadth of 9 mm, against 12 mm of the holotype, and is probably an earlier moult of the same species.

Paranecrocaricinus digitatus Wright & Collins, 1972 Fig. 11

A further specimen from Wilmington (BMNH IC 5) confirms the restoration given by Wright & Collins (1972: text-fig. 10a).

Hemioon elongatum (Milne-Edwards, 1862)

A poorly preserved specimen has been found in Bed C of the Devon Cenomanian Limestone, thus extending the range of this species to the *Calycoceras guerangeri* Zone of the Upper Cenomanian.

Withersella crepitans Wright & Collins, 1972 Figs 12, 16

Wright & Collins (1972: 91) established *W.crepitans* on the basis of 14 specimens of a delicate crab from the Crackers Bed at Atherfield. They gave a restored diagrammatic view of the cephalothorax showing the frontal margin with broad rectangular indentations and teeth. Subsequently a specimen was found (BMNH IC 15) with the left frontal margin almost perfectly preserved indicating that the diagram in Wright & Collins was based on a broken edge of the thin carapace.

The actual frontal margin (Figs 12, 16), is bounded by large outer orbital spines and is rather concave, interrupted only by paired oblique supraorbital fissures and a marked inner orbital spine on either side of a bifid rostrum. In effect the front of *Withersella* is extremely close to that of *Carcineretes walcotti* Withers, except for the greater projection of the rostrum in *Withersella*, thus confirming the attribution to Carcineretidae by Wright & Collins, which Glaessner (1980: 180) had regarded as unconvincing. Also, the front of *Withersella* more closely resembles that of *Binkhorstia* than was apparent in 1972, although there are significant differences in the latter's peculiar spatulate rostrum, third supraorbital fissure and less oblique fissures (Collins, Fraaye & Jagt, 1995: figs 12a-c).

REFERENCES

Bell, T. 1863. A monograph of the fossil malacostracous Crustacea of Great Britain. Part II, Crustacea of the Gault and Greensand. *Monograph of the Palaeontographical Society of London.* viii + 40 pp., 11 pls.

Collins, J.S.H., Fraaye, R.H.B. & Jagt, J.W.M. 1995. Late Cretaceous anomurans and brachyurans from the Maastrichtian type area. *Acta Palaeontologica Polonica*, **40**: 165–210, 12 figs.

Glaessner, M.F. 1931. Geologisches Studien in des aüsseren Klippenzone. *Jahrbuch der geologischen Bundesanstalt*, Wein, **81**: 1–23.

Förster, R. 1968. *Paranecrocarcinus libanoticus* n. sp. (Decapoda) und die Entwicklung der Calappidae in der Kreide. *Mitteilungen der Bayerischen Staatssammlung für Paläontologie und historische Geologie*, **8**: 167–195, pl. 13.

—— 1970. Neue Decapoden Reste aus der Oberkreide von Moçambique, Norddeutschland und den bayerischen Alpen. *Paläontologische Zeitschrift*, **44**: 134–144, pl. 17.

Stenzel, H.B. 1945. Decapod crustaceans from the Cretaceous of Texas. *Bulletin of the University of Texas Bureau of economic Geology and Technology*, **4401**: 401–476, pls. 34–45.

Withers, T.H. 1928. New Cretaceous crabs from England and Syria. *Annals and Magazine of Natural History*, (10) **2**: 456–462, pl. 13.

Wright C.W. & J.S.H. Collins, 1972. British Cretaceous Crabs. *Monograph of the Palaeontographical Society of London.* 114pp., 22 pls.